



SDMS DocID 269699

ROUTING AND TRANSMITTAL SLIP

Date 1/13/87

TO: (Name, office symbol, room number, building, Agency/Post)	Initials	Date
1. Dick McGrath		
2. Battelle New England		
3. 317 Washington St.		
4. Duxbury, MA 02332		
5.		

Action	File	Note and Return
Approval	For Clearance	<input checked="" type="checkbox"/> For Conversation
As Requested	For Correction	Prepare Reply
Circulate	<input checked="" type="checkbox"/> For Your Information	See Me
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Coordination	Justify	

REMARKS
 The first ~~three~~^{six} of these pages are from Brown's RFTs. The last three are from a letter recently sent by Brown to Jim Lake of Massachusetts. "Table 2" shows his dechlorination calculations.

DO NOT use this form as a RECORD of approvals, concurrences, disposals, clearances, and similar actions

FROM: (Name, org. symbol, Agency/Post)	Room No.—Bldg.
Charlie Bering	
	Phone No.

Table 2. Approximate Numbers of Half-Losses^a Shown by Various PCB Congeners in Sediments^b Showing Well-developed Dechlorination Pattern H (or H')

Subst. on Presumably less active ring	Substitution pattern on presumably more active ring and observed dechlorination pattern												
	234 H	2345 H	34 H	345 H	2346 H	245 H	23456 H	23 H	23 (H')	235 H	235 (H')	236 H	236 (H')
2 or 4			4		2	2	1	1.5	(3)	1.5	(2.7)	0	(1)
24 or 25	3.5	3	3	2	1	1	1	0.5	(2)			0	(0)
235 or 245	2	1	1	0.5		~0.7 ^c	1					0	(0)
2345	1												
26	2		0					0	(0)			0	(0)
236	2	1.5	0			0?		0	(0)			0	(0)
2356	1		0	0				0	(0)				

- Log₂ fractional retention of indicated peak, measured relative to Peak² 39 or 61.
- As represented by Acushnet estuary sediments 17B, 19B, and 21B for Pattern H, or 12B for Pattern H'.
- Clearance of <0.5 half-loss for 245-245 suggested by the difficultly measured change in Peak 75; of >1 half-losses suggested by net gain in Peaks 31 plus 53 (25-25 plus 245-25).

Attachment XIX-9

Table 3. PCB Levels, Distributions, and Alteration States in Subsurface Sediments of the Upper Acushnet River Estuary, New Bedford, MA

No., side	Latitude (41°N)	Sample texture ^d	Total oils, ppm ^e	Total PCBs, ppm ^e	Orig. 1242: 1254	Soln., loss (%)	Dechlor'n Status			
							Pat- tern	half- losses P50	half- losses P58	half- losses 58-50
- 19A	40'30"	sft mud	20,000	1,637	68:32	40 ^g	H	2.5	3.1	0.6
- 19B	40'30"	sft mud	28,400	1,126	57:43	40 ^g	H	3.2	3.5	0.3
- 18A	40'30"	snd	20,700	3,285	05:95	5	H?	~0.0	0.6	0.6
- 18B	40'30"	snd	7,040	739	06:94	6	H?	~0.1	0.8	0.7
- 21A	40'26"	gr, snd	11,100	3,775	47:53	4	H	1.9	2.2	0.3
- 21B	40'26"	gr, snd	1,400	417	40:60	5	H	2.0	2.2	0.2
17A -	40'21"	sft mud	46,300	3,292	80:20	9	H	0.8	2.3	1.5
17B -	40'21"	sft mud	40,300	3,724	70:30	12 ^h	H	1.9	3.2	1.3
- 22A	40'16"	snd	5,390	765	81:19	33 ^h	H	2.3	3.1	0.8
- 22B	40'16"	snd	8,110	1,444	64:32	14	H	1.9	3.5	1.6
14A -	40'16"	snd, mud	3,840	40.4	74:26	34	H	0.9	1.6	0.7
14B -	40'16"	snd, mud	3,390	0.9	~76:24	-	H?	~0.7	~0.8	-
12A -	40'14"	gr, snd	8,730	505	84:16	11	H'	2.1	1.6	-0.5
12B -	40'14"	gr, snd	6,070	526	82:18	51	H'	3.1	2.3	-0.8
- 24A	40'12"	gr, snd	<150	0.7	~70:30	-	H?	~0.6	~1.6	-
- 24B	40'12"	gr, snd	<150	0.3	~65:35	-	H?	~0.9	~1.6	-
9A -	40'11"	gr, mud	26,700	490	94:06	8	H'	1.9	1.0	-0.9
9B -	40'11"	gr, mud	22,900	1,135	91:09	30 ^h	H'	2.7	1.8	-0.9
5A -	40'01"	gr, snd	12,800	304	82:18	44 ^h	H	1.2	1.1	-0.1
5B -	40'01"	gr, snd	34,500	785	86:14	22	H	2.3	1.4	-0.9
2A -	39'55"	gr, snd	1,570	150	71:29	29	H	0.9	0.7	-0.2
2B -	39'55"	gr, snd	2,050	171	67:33	22	H	2.3	1.6	-0.7
- 26A	39'39"	fiber	<440	3.2	~54:46	-	H	~1.3	~1.9	-
- 26B	39'39"	fiber	<370	0.6	~64:36	-	H?	~0.5	~1.3	-
Average for all sites:			13,000	1,013	61:39	18	-	1.6	1.6	0.0

- Depth of "A" samples 5-7.5 cm; of "B" samples 15-17.5 cm.
- Sites located on west side of estuary, 70°55'06-09" W.
- Sites located on east side of estuary, 70°54'51-59" W.
- Key: sft, soft black mud, H₂S odor; snd, sand; gr, gravel; fiber, apparently spartina root mass (marsh bed).
- Parts per million of air-dried sediment weight.
- Log₂ fractional retention of peak 50 (mainly 23-34 CB from Aroclor 1242) or of peak 58 (mainly 234-25 CB from Aroclor 1254), or differences between these numbers of half-losses.
- This calculated value probably an underestimate.
- This calculated value probably an overestimate.

Attachment XIX-8

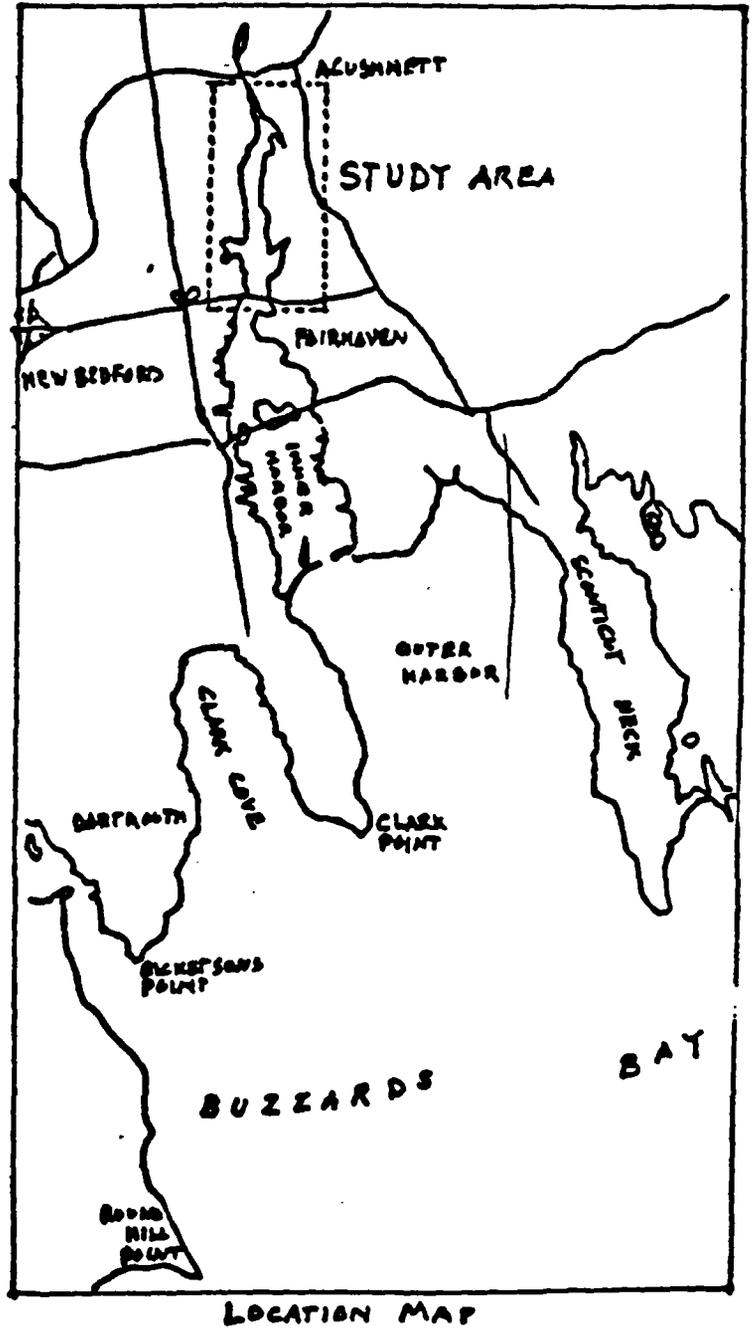
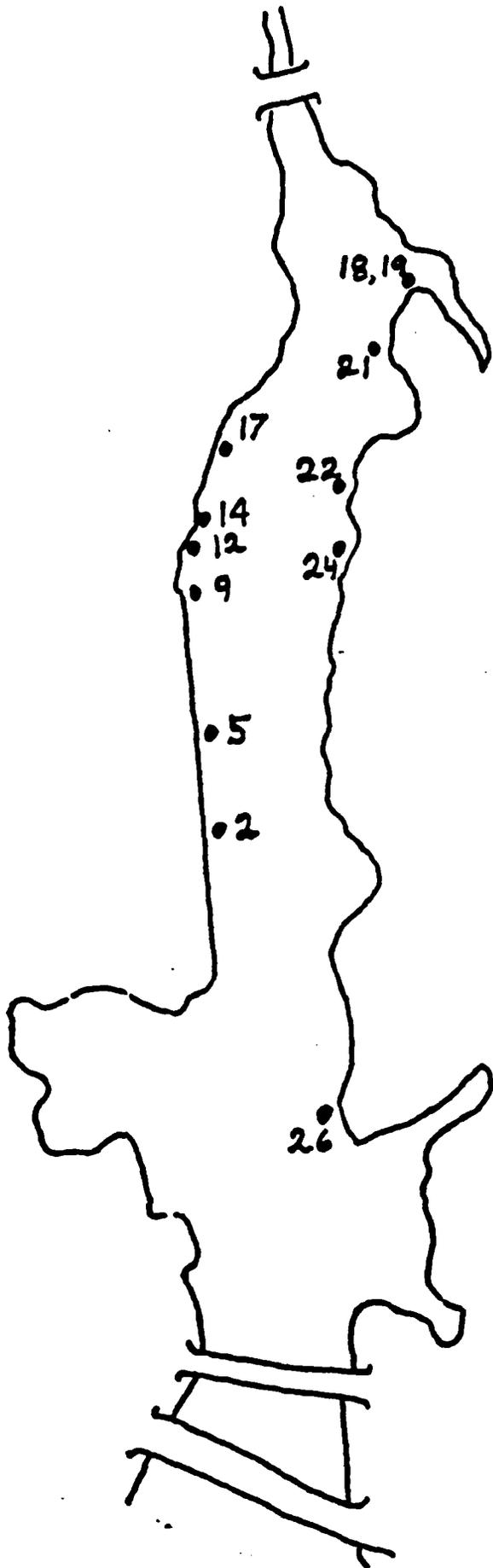


Figure 1. Map of Upper Acushnet River Estuary sediment study area, showing locations of collection sites.

Table 1. Derivation of Selection Pattern for PCB Congener Dechlorination by Acushnet River Sediment System H.^a

1. No dechlorination of 2-, 3-, or 4-monochlorophenyl groups

No decr:	2-2	2-3	2-4	2-3	2-4
No incr:	2-	2-	2-	3-	4-

2. No dechlorination of 24-, 25-, 26-, or 35-dichlorophenyls

No decr:	24-2	24-3	24-4	24-25	24-24	24-26
No decr:	25-2	25-3	25-4	25-25	25-24	25-26
No decr:	26-2	26-3	26-4	26-25	26-24	26-23
No decr:		35-2				
No incr:	2-2	(2-3) ^c	(2-4) ^c	(25-2) ^c	(24-2) ^c	26-2 (24-2) ^c

3. No dechlorination of 236- or 246-trichlorophenyl groups

No decr:	236-2	236-4	(236-23) ^b	236-24	236-25	(236-26) ^b
No decr:		(236-4) ^b		246-24	246-25	
No incr:	26-2	26-4	26-23	26-24	26-25	26-26

4. No dechlorination of 2356-tetrachlorophenyl groups

No decr:	2356-25	(2356-34) ^b	2356-236
No incr:	(236-25) ^c	236-34	236-236

5. Extensive dechlorination of 34- to 3-chlorophenyl groups^{*}

Decr:	2-34	(3-34) ^b	4-34	23-34	24-34	34-34
Incr:	2-3	3-3	4-3	(23-3) ^b	24-3	34-3

Decr:	235-34	245-34
Incr:	235-3	245-3

* Note: Minor conversion of 34- to 4-CP may also occur, but cannot be proven because of high background level of 4-CP groups.

6. But 34-CP dechlorination blocked by 2'6'-disubstitution

No decr:	26-34	236-34	246-34	(2356-34) ^b
No incr:	26-3	(236-3) ^b	(246-3) ^b	(2356-3) ^b

7. Extensive dechlorination of 23- to 2-chlorophenyl groups

Decr:	23-2	(23-3) ^b	23-4	23-23	23-24	23-25
Incr:	2-2	(2-3) ^c	2-4	(23-2) ^e	24-2	25-2

8. But 23-CP dechlorination blocked by 2'6'-disubstitution

No decr:	23-26	(236-23) ^b	2356-23
No incr:	26-2	236-2	(2356-2) ^b

9. Extensive dechlorination of 234- to 24- and probably also 23-chlorophenyl groups

Decr:	234-23	234-24	234-25	234-245	234-234
Incr:	(24-23) ^e	24-24	24-25	24-245	(24-234) ^e
Incr:	(23-23) ^e	23-24 ^f	23-25 ^f	(23-245) ^e	(23-234) ^e

Note: 234-CP conversion occurs even with 2'6'-disubstitution

Decr:	236-234	2356-234
Incr:	236-24	2356-24

10. Dechlorination of 245- to 25- and possibly also 24-chlorophenyl groups *

Decr:	245-2	245-4	245-25	(245-24) ^d	245-245
Incr:	(25-2) ^c	(25-4) ^c	25-25	25-24	(245-25) ^e
?? Incr:	(24-2) ^c	(24-4) ^c	(24-25) ^c	(24-24) ^c	(245-24) ^c

Note: 245-CP conversion possibly occurs even with 2'6'-disubstitution

Probable decrease:	236-245
Probable increase:	236-25

11. Dechlorination of 235- to 25- and/or 23-chlorophenyls

Clear decrease: 235-4; probable decrease: 235-25

12. Dechlorination of 345- to 35- and possibly also 34-chlorophenyl groups

Decr:	(345-2) ^b	345-23	(345-24) ^b	345-25
Incr:	35-2	(35-23) ^b	35-24	(35-25) ^b
?? Incr:	(34-2) ^e	(34-23) ^e	(34-24) ^e	(34-25) ^e

13. Dechlorination of 2345- to 235- (and/or 245- and 234) CP

Decreased: 2345-4, 2345-23, 2345-24, 2345-25, 2345-34, 2345-236,
2345-245, 2345-234

Possible increases, evidenced by retarded clearance: 235-23,
235-24, 235-235, 235-245

14. Dechlorination of 2346- to 246- and possibly 236-CP

Decr:	2346-25	(2346-24) ^b	2346-34	2346-236	2346-245
Incr:	246-25	246-24	246-34	(246-236) ^b	246-245
?? Incr:	(236-25) ^c	(236-24) ^c	(236-34) ^c	(236-236) ^c	(236-245) ^c

15. Dechlorination of 23456 to tetrachlorophenyl groups

Decreases seen in 23456-4, 23456-25 and 23456-34

Footnotes:

a. Key. decr, decrease; incr, increase in level of indicated PCB congener. Parentheses indicate observed change in peak containing indicated congener equivocal or contradictory for reason indicated by footnote.

b. Indicated congener too small a component of observed peak to be certain of its level of change; or, observed peak itself too small for reliable measurement of change.

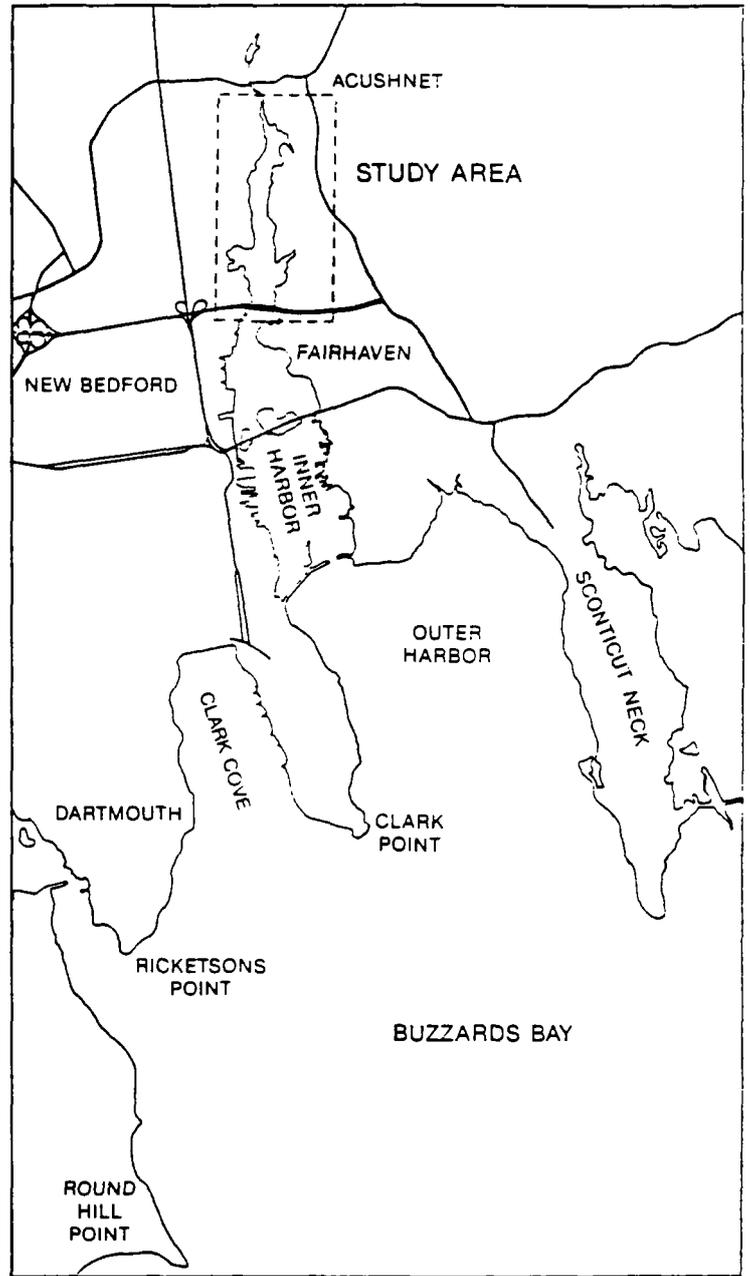
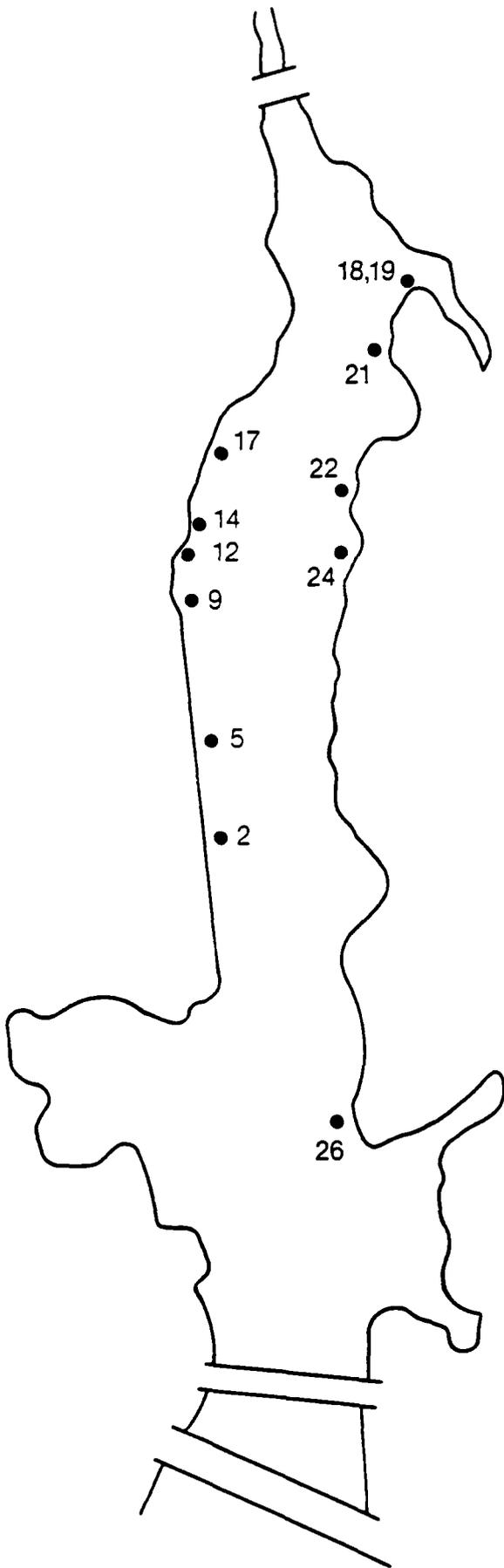
c. Change or non-change due to conversion of indicated congener too small a part of total observed change to be certain of its contribution.

d. Congener believed to be undergoing formation from other congeners faster than being consumed by the indicated process.

e. Congener believed to be undergoing further dechlorination to other congeners faster than being produced by the indicated process.

f. Actual increase seen at one site (21A, 21B); little or no net clearance at several others where 1254 levels high.

from J.F. Brown, Jr.

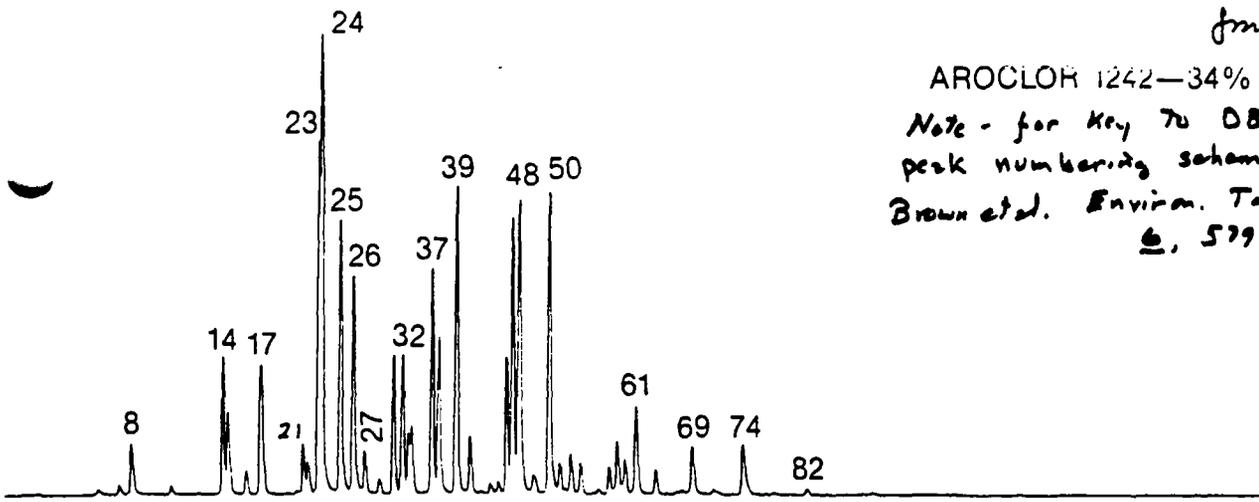


LOCATION MAP

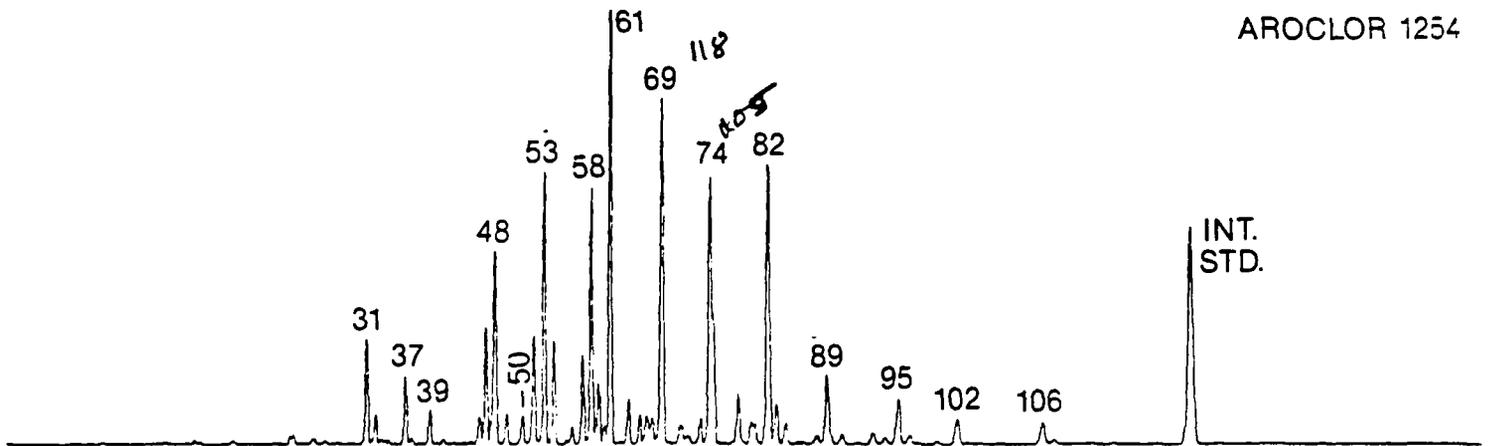
Map of Upper Acushnet River Estuary sediment study area, showing locations of collection sites.

from J.F. Brown.

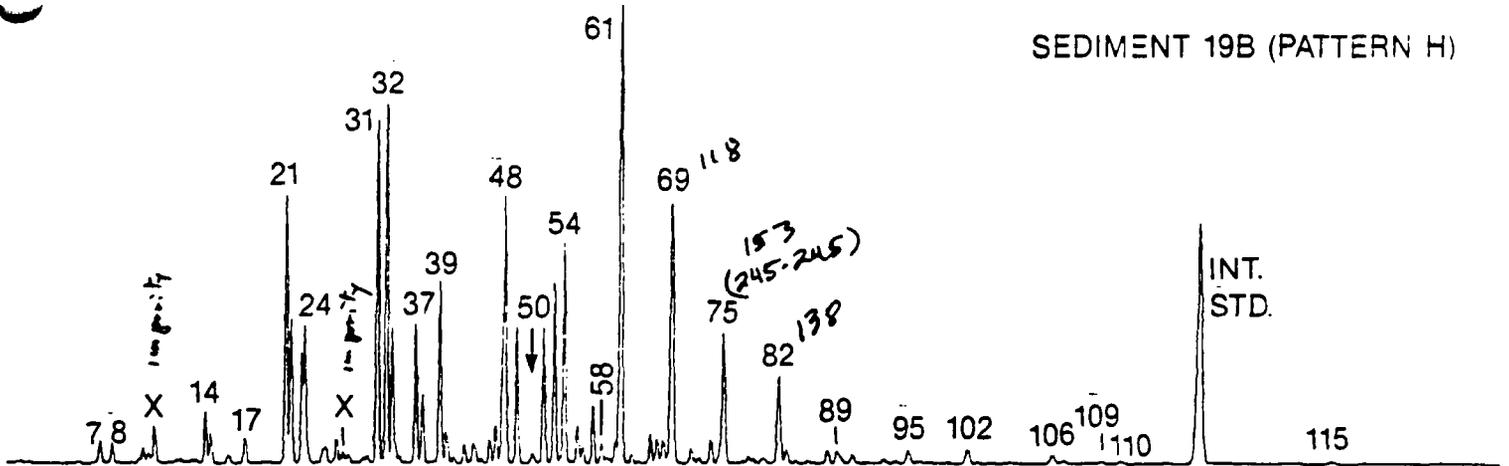
AROCLOR 1242—34% EVAPORATED
Note - for key to DB-1 capillary
peak numbering scheme used, see
Brown et al. Environ. Toxicol. Chem.
6, 579-593 (1987).



AROCLOR 1254



SEDIMENT 19B (PATTERN H)



SEDIMENT 12B (PATTERN H')

